



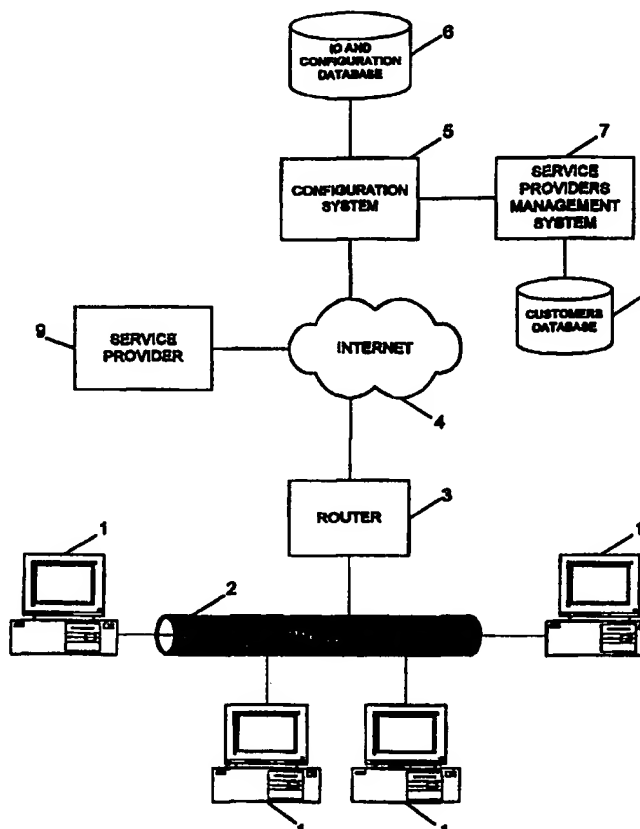
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

| | | |
|---|-----------|---|
| (51) International Patent Classification ⁶ : H04L 29/06 | A1 | (11) International Publication Number: WO 99/21336 |
| | | (43) International Publication Date: 29 April 1999 (29.04.99) |
| <p>(21) International Application Number: PCT/GB97/02850</p> <p>(22) International Filing Date: 16 October 1997 (16.10.97)</p> <p>(71) Applicant (for all designated States except US): VIRTUAL ACCESS (IRELAND) LIMITED [IE/IE]; Unit 17, IDA Enterprise Centre, Pearse Street, Dublin 2 (IE).</p> <p>(72) Inventors; and</p> <p>(75) Inventors/Applicants (for US only): SLABY, John [US/GB]; Virtual Access (UK) Limited, Technology Transfer Centre, Silwood Park, Ascot SL5 7PW (GB). LOUGHLIN, Thomas [IE/IE]; Virtual Access (Ireland) Limited, Unit 17, IDA Enterprise Centre, Pearse Street, Dublin 2 (IE). BRANKIN, Henry [IE/IE]; Virtual Access (Ireland) Limited, Unit 17, IDA Enterprise Centre, Pearse Street, Dublin 2 (IE).</p> <p>(74) Agents: BERESFORD, Keith, Denis, Lewis et al.; Beresford & Co., 2-5 Warwick Court, High Holborn, London WC1R 5DJ (GB).</p> | | <p>(81) Designated States: AT, AT (Utility model), CA, CN, DE, DE (Utility model), GB, JP, US, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p>Published <i>With international search report.</i></p> |

(54) Title: AN APPARATUS AND METHOD FOR CONTROLLING ACCESS TO A SERVICE OVER A COMMUNICATIONS SYSTEM

(57) Abstract

Apparatus for accessing a service over a communication network comprises an interface for connection to a communication line of the network, a memory for storing a unique serial number and configuration data, and a processor for controlling the interface to communicate with a remote configuration system when the apparatus is first connected to the communication line and to then transmit the unique serial number. Configuration data is received from the remote configuration system and stored in the memory. The apparatus is then reinitialised to use the configuration data for future communications to access a service over the network.



FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

| | | | | | | | |
|----|--------------------------|----|--|----|--|----|--------------------------|
| AL | Albania | ES | Spain | LS | Lesotho | SI | Slovenia |
| AM | Armenia | FI | Finland | LT | Lithuania | SK | Slovakia |
| AT | Austria | FR | France | LU | Luxembourg | SN | Senegal |
| AU | Australia | GA | Gabon | LV | Latvia | SZ | Swaziland |
| AZ | Azerbaijan | GB | United Kingdom | MC | Monaco | TD | Chad |
| BA | Bosnia and Herzegovina | GE | Georgia | MD | Republic of Moldova | TG | Togo |
| BB | Barbados | GH | Ghana | MG | Madagascar | TJ | Tajikistan |
| BE | Belgium | GN | Guinea | MK | The former Yugoslav Republic of Macedonia | TM | Turkmenistan |
| BF | Burkina Faso | GR | Greece | ML | Mali | TR | Turkey |
| BG | Bulgaria | HU | Hungary | MN | Mongolia | TT | Trinidad and Tobago |
| BJ | Benin | IE | Ireland | MR | Mauritania | UA | Ukraine |
| BR | Brazil | IL | Israel | MW | Malawi | UG | Uganda |
| BY | Belarus | IS | Iceland | MX | Mexico | US | United States of America |
| CA | Canada | IT | Italy | NE | Niger | UZ | Uzbekistan |
| CF | Central African Republic | JP | Japan | NL | Netherlands | VN | Viet Nam |
| CG | Congo | KE | Kenya | NO | Norway | YU | Yugoslavia |
| CH | Switzerland | KG | Kyrgyzstan | NZ | New Zealand | ZW | Zimbabwe |
| CI | Côte d'Ivoire | KP | Democratic People's Republic of Korea | PL | Poland | | |
| CM | Cameroon | KR | Republic of Korea | PT | Portugal | | |
| CN | China | KZ | Kazakstan | RO | Romania | | |
| CU | Cuba | LC | Saint Lucia | RU | Russian Federation | | |
| CZ | Czech Republic | LI | Liechtenstein | SD | Sudan | | |
| DE | Germany | LK | Sri Lanka | SE | Sweden | | |
| DK | Denmark | LR | Liberia | SG | Singapore | | |
| EE | Estonia | | | | | | |

**AN APPARATUS AND METHOD FOR CONTROLLING ACCESS TO A
SERVICE OVER A COMMUNICATIONS SYSTEM**

The present invention generally relates to a method and
5 apparatus for controlling access to a service over a
communication system.

With the ever-increasing use of networks of computers
there is an increasing need to simplify the setting up
10 of a network and to more efficiently monitor the
operation of the network.

One method by which computers can be networked over large
distances is by using the telecommunications network.
15 The prime example of this is the internet. The
interconnections into the internet can either be via
conventional analogue lines, via the integrated services
digital network (ISDN) or via a permanent connection such
as a leased line. An alternative network comprises the
20 frame relay network that allows for high data transfers
and requires a permanent connection.

A problem with interfacing to a communications network
in order to access a service is that the interface
25 apparatus must be configured for communication.
Conventionally this is carried out manually requiring a
user to either follow a series of steps, and/or to have

some knowledge of networking.

When a service is provided over a network, the service provider will collect and process statistics on events
5 surrounding the usage of the service by each user. This requires the service provider to gather and process a large amount of data and if a user wishes to obtain any of the statistics related to access to the service by the user, the user must request this information from the
10 service provider whereupon the service provider can transmit the information to the user.

It is an object of one aspect of the present invention to overcome the problem of configuring apparatus for
15 accessing a service by providing an apparatus which can automatically configure itself.

Thus in accordance with the first aspect the present invention is concerned with apparatus for interfacing to
20 a communication network in order to access a service wherein unique identification information which is stored in a memory is transmitted over the network to a remote configuration system the first time the apparatus is connected to the network. The remote configuration
25 system determines appropriate configuration data which is transmitted back to the apparatus and stored for future use. The configuration data will be used

thereafter by the apparatus in order to configure the apparatus for accessing the service.

Thus this aspect of the present invention removes the
5 need for a user to have any knowledge of networking or
to have to undergo any steps in configuring the apparatus
to access a service. At the time of purchase, the user
will subscribe to a service whereupon a third party
responsible for configuring the apparatus remotely is
10 given information on the user, the unique identifying
information for the apparatus, and possibly the level
and/or type of service required by the user. The third
party can comprise the service provider or any third
party delegated by a service provider to provide the
15 configuration service. Using the information on the
level and/or type of service required for the user, and
the unique identifying information, configuration data
can thus be generated at a remote configuration system
ready to be downloaded to the apparatus when it is first
20 connected. The apparatus will be pre-configured with
data which instructs the apparatus to automatically
connect to the remote configuration system when it is
first connected in order to obtain the configuration
data. In a telecommunications network for example the
25 initially set configuration data can cause the apparatus
to dial a telephone number which connects automatically
to the remote configuration system. In a fixed network

the configuration data could simply instruct the apparatus to make a connection to a particular address in the network.

5 The apparatus can be incorporated within a computer system to control the communications between the computer system and the service. Alternatively, the apparatus can comprise an interface between a computer system and a communications network. The computer system can comprise
10 a single computer or a network of computers for example networked by a local area network.

The interconnection between the apparatus and the service can be made via any form of network. In one embodiment
15 a communication connection made to the apparatus comprises at least one ISDN line. In such an arrangement a D channel can be used for permanent connection between the apparatus and the network whilst the B channels can be used as necessary for communications. In this way the
20 D channel can allow for permanent monitoring of the apparatus by a remote system such as the service provider or some form of management system. Further, subsequent configuration data can be sent to the apparatus from the remote configuration system in order to change the
25 configuration of the apparatus for subsequent communications. The subsequent configuration data can be sent using the D channel at any time without the user

having to make a connection using the B channels. The subsequent configuration data can either be sent as a result of a request from the user or it can be automatically sent.

5

It is an object of another aspect of the present invention to reduce the processing of communication information by the service provider and to reduce the flow of communication control data over the network.

10

In accordance with this aspect, the present invention is concerned with apparatus for communicating with a remote system over a network to access a service wherein information on the usage made of the service by the computer system is gathered, processed, locally stored, and then transmitted to a remote management system.

15

In one embodiment the remote management system comprises the service provider and thus by locally processing the information and only transmitting the processed information, not only is the processing requirements of the service provider reduced, but also the amount of information which must be transmitted is reduced. Further, since the processed information is locally stored, it is readily accessible by users of the apparatus.

20

25

The information which can be gathered can comprise for example the number of bytes transmitted and received, the number of frames transmitted and/or received, the number of errors, and the number of calls made over a telecommunications line.

In one embodiment the apparatus includes a clock such that the information can be gathered with respect to time and the processing can be carried out periodically to generate summary information which summarises the information on the communications made.

To allow a user local access to the processed information, a user interface is provided which can take any convenient form such as a serial interface, or more conveniently the apparatus can operate a computer program to provide the user interface which can comprise a Graphical User Interface (GUI) such as a web page. In such an arrangement a machine independent program e.g. a Java applet can be run in order to obtain the processed information and arrange it for output to the user in a graphical user interface form such a web page.

Configuration of data initially set in the apparatus, or configuration data obtained remotely in accordance with the first aspect of the present invention can determine the processing carried out on the gathered information.

Embodiments of the present invention will now be described with reference to the accompanying drawings in which:

Figure 1 is a schematic drawing of a generalised system in accordance with an embodiment of the present invention;

Figure 2 is a schematic drawing of an arrangement using the frame relay network in accordance with an embodiment of the present invention;

Figure 3 is a schematic drawing of an arrangement using the internet in accordance with an embodiment of the present invention;

Figure 4 is a functional diagram of the apparatus in accordance with an embodiment of the present invention;

Figure 5 is a schematic drawing of the apparatus in accordance with an embodiment of the present invention; and

Figure 6 is a flow diagram illustrating the steps involved in configuring the apparatus in accordance with an embodiment of the present invention.

Referring now to Figure 1, this diagram illustrates a generalised system in accordance with an embodiment of the present invention wherein a computer system 100 is connected via an interface 200 to a network 300 in order to access a service 400. A management system 500 is

provided connected to the network 300 in order to control access to the service and to provide configuration data for the interface 200 as required.

- 5 Although the computer system 100 and interface 200 are shown in Figure 1 separately, the interface 200 can be combined within the computer system 100.

Figure 2 illustrates schematically a more specific
10 embodiment of the present invention which utilises the frame relay network. In this embodiment computers 10 are networked over a local area network (LAN) (11) which is provided with an interface 12 which is connected to an ISDN network 13 via a basic rate ISDN (BRI) line. The
15 ISDN network 13 is connected to the frame relay network via a primary rate ISDN (PRI) line. A remote computer system 16 is connected to the frame relay network 14 using the frame relay (FR) line and a configuration centre 15 is provided also connected to the frame relay
20 network 14 for providing configuration data to the interface 12.

In this embodiment when the interface 12 is initially installed it is configured to dial into the frame relay
25 network 14 via the ISDN network 13 in order to obtain configuration data from the configuration centre 15. The automatic configuration capability in this arrangement

removes the necessity for the user of interface 12 to have any knowledge or understanding of the network to which the interface 12 is being connected. The interface 12 is initially configured (factory set) to connect to the configuration centre 15 which will have been provided with information on the service required by the user of the interface 12 and the unique serial number of the interface 12 e.g. at the point of purchase. In this way once the interface 12 has connected to the configuration centre 15, it will transmit its unique serial number whereupon the configuration centre 15 will determine e.g. look up the required configuration data for transmission back to the interface 12. Once the interface 12 has received the new configuration data, this can be used for all future communications in order to connect to the remote computer system 16. The re-configuring of the interface 12 can take place by a re-initialisation of the interface 12, by a reloading of the controlling software and configuration data, or simply by re-reading the configuration data.

Figure 3 illustrates an alternative embodiment of the present invention wherein computers 1 are connected over a local area network which in this embodiment comprises an ethernet 2. A router 3 is connected to the ethernet 2 to interface the ethernet 2 to the internet 4. A service provider 9 is connected to the router 3 via the

internet 4 and a configuration system 5 is also connected to the internet 4 and accessible to the router 3. The configuration system 5 is provided with a database 6 of configuration data for each router serial number. Also
5 Figure 3 illustrates the presence of a service provider's management system 7 and a customer's database 8.

The operation of this system will now be described with reference to the flow diagram of Figure 6. When the
10 router 3 is purchased or soon thereafter and before first connection to access the service, the user registers with the service provider. The registration takes the form of providing the service provider with the serial number of the router, details of the user, and possibly
15 information which identifies the level or type of service required from the provider. Of course, where the provider only provides one level of service i.e. a simple connection, there is no need for this information since it is assumed that if the user is registering connection
20 is required. Such information provided to the service provider is typically held in a customer database 8. The service provider's management system 7 will contain the customer details not just for the purposes of configuration, but also for general management purposes
25 such as billing. The information can then be passed from the service provider's management system 7 into the configuration system 5 which can comprise a separate

computer. Alternatively, the functions of the configuration system 5 and the service provider's management system 7 could be combined. With the information on the level and/or type of service required and the serial number of the router, the configuration system can then determine suitable configuration data and install this in the database 6. Of course, as new routers are purchased for use in accessing the service, this process of determining suitable configuration data will be repeated to build up the database 6.

When the router is connected to the internet via for example an ISDN line, the router automatically dials the configuration system and when the connection is made it transmits its unique serial number. The serial number can be encoded for security purposes before being transmitted. When the configuration system receives the serial number, if it is encoded it is decoded and it then goes through a verification process to determine whether it is a valid serial number. If validation is successful the configuration system refers to the database 6 to look up the appropriate configuration data which is then transmitted to the router 3 for storage in the local memory. The transmitted configuration data can be suitably encoded before transmission for security purposes. The connection by the router to the configuration system 5 can then be terminated and the

router can then configure itself in accordance with the newly downloaded configuration data. This can be achieved by a re-initialisation of the router, a reloading of the control software and configuration data, or simply by re-reading the configuration data. Once this has been carried out, the router is now configured for future access to the service provided by the service provider 9 i.e. the configuration data has set up the router to dial the correct telephone number to be connected to the service provider, it has loaded a user name and password into the router for transmission to the service provider, and it has set up other connection parameters required for communication between the router and the service provider.

15

Since in Figure 3 the router 3 comprises a LAN access router, users of the computers 1 looking to access the services of the service provider 9 will be able to do so seamlessly via the router 3. None of the users of the computers or the network manager of the local network need carry out any steps in configuring the LAN access router initially. Also, it is possible for the configuration system 5 to amend or update the configuration data in the router 3 remotely without the need for the local users or local network manager to do anything. One reason for updating the configuration data may be that the connection parameters have changed e.g.

20
25

the telephone number for the service provider is changed or the data rate. In such circumstances the configuration system 5 may automatically download new configuration data to the router 3 for subsequent use.

5 Alternatively, where a service provider 3 provides different levels of service or possibly even a different service provider is required by the user of the router 3, the user will have contacted the service provider requesting a new or updated level of service. This will
10 of course result in new or updated configuration data in the database 6 which will be automatically downloaded to the router 3. It may also be possible for the user of the router 3 i.e. the local network management to make an online request for updated configuration data.

15

In this embodiment the connection between the network 4 and the router 3 can be via any form of convenient communication line e.g. a conventional analogue line, an ISDN line, or a permanent communication line. If the
20 communication line is analogue, of course the router will include a modem. Where an ISDN line is available, this will provide a high data rate without the cost of a permanent line. Also, since an ISDN line includes a data (D) channel which can be permanently open for
25 communications of data, the configuration system 5 can use the D channel for downloading configuration data to the router 3.

The configuration system 5 can comprise a workstation running a configuration setup application. The database 6 can be provided within the workstation using any suitable database software such as Microsoft's SQL database software. In order to provide a convenient interface to the user the server can run Microsoft's Internet InfoServer to provide a web interface. The workstation will also operate as a file transfer protocol (FTP) server for the transfer of the configuration data to the router 3.

Although in Figure 3 the configuration system 5 is illustrated as being directly connected to the internet 4, the workstation may be connected to a LAN which has a router connected thereto. Any method of connecting the configuration system 5 to the internet can be used which allows for the router 3 to connect directly into it to obtain configuration data. Thus, although the configuration system 5 is most likely to be operated by the service provider, it need not be and can be operated by a third party.

In the configuration system, in order to form the configuration data there are three levels of configurations to be considered and these are (1) configuration parameters for the hardware of the router, (2) configuration parameters specific to the provider's

service and (3) parameters specific to the requirements of the user. In the specific embodiment the Microsoft Internet Information server acts as interface between the operator of the system and the Microsoft SQL database to
5 allow for the parameters to be entered into the database to form the configuration data.

Although Figure 3 illustrates that the router 3 has only one communication line to the internet, it may have a
10 number of communication lines for simultaneous communication to a number of service providers and possibly to a number of configuration systems. Thus, the router 3 will be capable of storing within its memory a configuration file for each communication line which
15 communicates to a service provider. Further, the router may not be limited to a single service provider and thus more than one set of configuration data may be provided (or a set of configuration data with options for different service providers) can be stored within its
20 memory and the router may enable a user to select the service provider to be accessed.

Although Figure 3 illustrates the router as interfacing a local area network to the internet, the router 3 may
25 in fact comprise a simple interface between a single computer system and the internet.

In a conventional network arrangement when a service provider provides a service over the internet to a user, it gathers statistics (i.e. information on events caused by access made by the user) and processes this raw statistical data into more useful summary data. This conventional method of gathering statistical information requires the service provider to continuously retrieve data from the user which stores the raw gathered statistics locally. If a user required summary information it was necessary previously to request this information from the service provider who would then download it to the user. The present invention overcomes the limitations of the prior art by providing for local processing of the gathered statistics so that this information can be made available locally and can be periodically uploaded to the service provider. Thus, the amount of information which needs to be passed up to the service provider is reduced, the processing load of the service provider is reduced, and processed statistics are readily available to the user.

In an embodiment of the present invention a manager of the router 3 such as a local area network manager is provided with a user interface which can comprise a web server allowing any one of the computers 1 to enter a URL to access a web page which will display the processed statistics. The processed statistics available to the

user can be processed in accordance with machine independent code which conveniently comprises a Java applet. In addition to this method of interfacing using the local area network 2, the router 3 can be provided
5 with a serial interface to allow local management e.g. the entry of configuration data or to obtain statistics.

In the router a log file is formed in memory which records each communication event and parameters of each
10 event. These parameters can be accessed locally via the user interface and are processed to form summary information which is also available locally via the user interface. The processed statistics will periodically be transmitted to the service provider. The statistics
15 can comprise the number of bytes transmitted and received, the number of frames transmitted and received, the number of errors, and the number of calls made. The configuration file which is remotely downloaded and includes parameters specific to the service provider,
20 will determine how often the raw statistical data is captured, what raw statistical data should be captured, and how many samples are to be kept. The number of variables and number of samples to be kept are limited by the memory capacity of the router 3 and this will be
25 taken into consideration by the configuration system during the formation of the configuration data since it will have all the information necessary to form the

appropriate configuration data.

The statistical processing is carried out by capturing events and synchronising these events with the operation
5 of a real time clock. This generates a table of raw statistical data. When the table of raw statistical data is full, the data is processed in accordance with the configuration data to form summary data in a summary table. It is this summary data in the summary table
10 which can be viewed by the user interface and the type of user interface can be determined by the configuration data.

Referring now to Figure 4, there is illustrated a
15 functional diagram of the router 3. A LAN port 30 interfaces the router 3 to the LAN. A route 32 is provided for communications which are to be routed to/from the LAN from/to the service provider and an ISDN port 35 is provided for interface to the
20 telecommunications network. A factory configuration 33 is initially set within the router which initiates an auto-configuration process 34 which causes the router to dial the remote configuration system and transmit its unique serial number. Configuration data 37 is thus
25 received a process 36 for configuring the router configures it for future communications. For all future communications a log function 40 logs communication

events to form log data 38. This forms part of the raw statistical data 43 which is processed by a statistics processing procedure 42 to generate processed statistics 41. A user interface 31 provides access for a user to the raw statistical data, the log data, and the processed statistics. The type of user interface is initially dependent upon the factory configuration and subsequently to the downloaded configuration data. The processed statistics 41 is not only available to the user interface 31, it is also available via the ISDN port 35 to the service provider.

Figure 5 illustrates schematically the structure of the router 3 in accordance with an embodiment of the present invention. A LAN interface is provided for connection to a LAN. The interface provides a network manager with access to the raw and processed statistical data and also allows for users to access the service provided by the service provider. A serial interface 26 is also provided for management and allows a manager to access not only the raw and processed statistical data but also the configuration data.

A real time clock 20 is provided for timing the recordal of events to form the statistical data for processing by the central processing unit 21. A dynamic random access memory 22 is also provided to act as the working memory.

Flash memory is provided for storing the programs for carrying out the configuration of the router, for carrying out the statistical processing, for routing the communications and for providing the user interface.

- 5 Also the configuration data is stored in the flash memory 23. This can comprise the initial factory configuration data and one or more sets of subsequently downloaded configuration data. Also, the serial number is stored in the flash memory 23. A battery-backed static RAM 24
- 10 is also provided for storing the statistical data such as the event log and the call log. An ISDN interface 29 is provided for interfacing to a basic rate ISDN (BRI) line and two plain old telephone service (POTS) interfaces 27a, 27b provide two analogue telephone lines
- 15 (one for each of the two B channels of the BRI line) for use by telephones 28a and 28b.

- Although the present invention has been described hereinabove with reference to specific embodiments, the
- 20 present invention is not limited to such embodiments and variations will be apparent to a skilled person in the art. For example, although the interface to a computer system has been described with reference to a LAN interface, any interface can be used e.g. a serial
- 25 interface such as an RS232 interface or a USB (universal serial bus). Further, more than one interface can be provided both to the computer system and to communication

lines. The communication lines can be any form of network communication lines such as a permanent leased line, an ISDN line, or a simple analogue line. Also, different services may be available for users on
5 different communication lines provided for by different communication data for those lines.

CLAIMS:

1. Apparatus for interfacing a computer system to a communication line to access a service, the apparatus
5 comprising:

first I/O means for connection to said computer system;

second I/O means for connection to the communication line;

10 storage means for storing unique identification information and configuration data for configuring the operation of the apparatus to access said service over said communication line;

processing means for detecting the first time said
15 second I/O means is connected to said communication line and for controlling said second I/O means to connect to a remote configuration system and to transmit said unique identification information in said storage means to the configuration system;

20 wherein said processing means is operable to control said second I/O means to receive configuration data from said configuration system, to store said configuration data in said storage means, and to control access to said service by said computer system in accordance with said
25 configuration data.

2. Apparatus according to claim 1 wherein said computer

system comprises a local area network (LAN) and said first I/O means comprises a LAN port.

3. Apparatus according to claim 1 or claim 2 wherein
5 said communication line comprises one or more ISDN lines
and said second I/O means comprises an ISDN port.

4. Apparatus according to claim 3 wherein said second
I/O means is adapted for connection to an ISDN line
10 having a data channel (D) and a plurality of bearer
channels (B).

5. Apparatus according to claim 3 or claim 4 including
at least one plain old telephone service (POTS) interface
15 for connecting a telephone to the or each ISDN line.

6. Apparatus according to claim 1 or claim 2 wherein
said processing means is operable to control said second
I/O means to receive subsequent configuration data from
20 said configuration system, to store said subsequent
configuration data in said storage means, and to control
subsequent access to said service by said computer system
in accordance with said subsequent configuration data.

25 7. Apparatus according to claim 6 including user
interface means for allowing a user to generate a request
for said subsequent configuration data, said processing

means being responsive to said request to control said second I/O means to transmit said request to said configuration system to cause said subsequent configuration data to be transmitted to said apparatus.

5

8. Apparatus according to claim 6 or claim 7 wherein said second I/O port means comprises an ISDN interface for connection to one or more ISDN lines of an ISDN network having one or more data channels permanently
10 connecting said ISDN interface to the ISDN network, and for receiving said subsequent configuration data using said data channel.

9. Apparatus according to claim 8 wherein said ISDN
15 lines have one or more communication channels and said ISDN interface is adapted to receive said subsequent configuration data also using one or more said communication channels.

20 10. Apparatus according to any one of claims 1, 2, 6 or 7 wherein said second I/O means is adapted for connection to a dedicated data communication line.

11. Apparatus according to any preceding claim wherein
25 said processing means is operable to gather information on the use of said service by said computer system, to process said information to generate summary information,

and to control said second I/O means to periodically transmit said summary information to a provider of said service.

- 5 12. Apparatus according to claim 11 including real time clock means, wherein said processing means is operable to use said real time clock means to gather real time information on the use of said service by said computer system.

10

13. Apparatus according to claim 11 or claim 12 including user interface means to allow a user of said apparatus access to said information.

- 15 14. Apparatus according to claim 13 wherein said user interface means comprises a further I/O means.

15. Apparatus according to claim 13 wherein said user interface means comprises a computer program running on
20 said processing means to allow a user of said computer system access to said summary information via said first I/O means.

16. Apparatus according to claim 15 wherein said user
25 interface means comprises said processor means operating as a web server.

17. Apparatus according to claim 16 wherein said processing means is operable to gather and process said information using machine independent instructions for output to said user.

5

18. Apparatus according to any preceding claim including encoding means for encoding said unique identification information before transmission by said second I/O means.

10 19. Apparatus according to any preceding claim including decoding means for decoding configuration data received in encoded form by said second I/O means.

15 20. Apparatus according to any preceding claim wherein said second I/O means includes a modem for connection to an analogue telephone line.

21. Apparatus for communicating with a remote system over a network to access a service, the apparatus
20 comprising:

I/O means for connection to the network;

storage means for storing the unique identification information and configuration data for the operation of the apparatus to access said service;

25 processing means for detecting the first time said I/O means is connected to said network and for controlling said I/O means to connect to a remote

configuration system and to transmit said unique identification information thereto;

wherein said processing means is operable to control said I/O means to receive configuration data from said configuration system, to store said configuration data
5 in said storage means, and to control access to said service in accordance with said configuration data.

22. Apparatus according to claim 21 wherein said
10 processing means is operable to control said I/O means to receive subsequent configuration data from said configuration system, to store said subsequent configuration data in said storage means, and to control subsequent access to said service in accordance with said
15 subsequent configuration data.

23. Apparatus according to claim 22 including user interface means for allowing a user to generate a request for said subsequent configuration data, said processing
20 means being responsive to said request to control said I/O means to transmit said request to said configuration system to cause said subsequent configuration data to be transmitted to said apparatus.

25 24. Apparatus according to claim 22 or claim 23 wherein said I/O port means comprises an ISDN interface for connection to one or more ISDN lines of an ISDN network

having one or more data channels permanently connecting said ISDN interface to the ISDN network, and for receiving said subsequent configuration data using said data channel.

5

25. Apparatus according to claim 24 wherein said ISDN lines have one or more communication channels and said ISDN interface is adapted to receive said subsequent configuration data also using one or more said communication channels.

10

26. Apparatus according to any one of claims 21 to 25 wherein said processing means is operable to gather information on the use of said service by said computer system, to process said information to generate summary information, and to control said I/O means to periodically transmit said summary information to a provider of said service.

15

27. Apparatus according to claim 26 including real time clock means, wherein said processing means is operable to use said real time clock means to gather real time information on the use of said service.

20

28. Apparatus according to claim 26 or claim 27 including user interface means to allow a user of said apparatus access to said information.

25

29. Apparatus according to claim 28 wherein said user interface means comprises a computer program running on said processing means to allow access to said summary information.

5

30. Apparatus according to claim 29 wherein said processing means is operable to gather and process said information using machine independent instructions for output to said user.

10

31. Apparatus according to any one of claims 21 to 30 including encoding means for encoding said unique identification information before transmission by said I/O means.

15

32. Apparatus according to any one of claims 21 to 31 including decoding means for decoding configuring received in encoded form by said I/O means.

20 33. A configuration system for connection to said apparatus according to any preceding claim via a communication network, said configuration system comprising:

I/O means for connection to said communication
25 network, and for receiving said unique identification information from said apparatus; and

configuration processing means responsive to said

unique identification information to determine configuration data for said apparatus,

wherein said I/O means is adapted to transmit said determined configuration data to said apparatus over said communications network.

34. A configuration system according to claim 33 wherein said configuration processing means is operative to determine said configuration data using said unique identification information, information on the user or users of said apparatus, and information on the level of service required by the user or users.

35. A configuration system according to claim 34 including obtaining means for obtaining said information on the user or users, and said information on the level of service required by the user or users.

36. A configuration system according to claim 35 wherein said obtaining means is adapted to obtain said information on the user or users, said information on the level of service required by the user or users, and expected unique identification information prior to receipt of said unique identification information by said I/O means, and said configuration processing means is operative to determine said configuration data before receipt of said unique identification information using

the information obtained by said obtaining means, to compare the received unique identification information with said expected unique identification, and to cause said I/O means to transmit the configuration data if
5 there is a match in the comparison.

37. A configuration system according to claim 36 including means for storing a plurality of sets of said configuration data for a corresponding plurality of said
10 expected unique identification information for a corresponding plurality of said apparatuses, wherein said configuration system can connect to a plurality of said apparatuses.

15 38. A configuration system according to any one of claims 33 to 37 wherein said configuration processing means is responsive to a request for said configuration data received by said I/O means from said apparatus to determine said configuration data and control said I/O
20 means to transmit said determined configuration data.

39. A configuration system according to any one of claims 33 to 38 wherein said configuration processing means is operative to automatically determine updated
25 configuration data and to cause said I/O means to transmit said updated configuration data to said apparatus.

40. A configuration system according to any one of claims 33 to 39 including decoding means for decoding encoded unique identification information received from said apparatus.

5

41. A configuration system according to any one of claims 37 to 40 including encoding means for encoding said configuration data for transmission to said apparatus.

10

42. Apparatus for interfacing a computer system to a communication line to access a service, the apparatus comprising:

first I/O means for connection to said computer system;

second I/O means for connection to said communication line;

processing means for gathering information on the use mode of said service by said computer system, for processing said information to generate processed information, and for controlling said second I/O means to transmit said processed information to a remote management system; and

storage means for storing said information and/or said processed information.

25

43. Apparatus according to claim 42 including clock

means, said processing means being responsive to said clock to gather said information with respect to time, to process said information periodically, and to cause said second I/O means to transmit said processed
5 information periodically to said remote management system.

44. Apparatus according to claim 42 or claim 43 including user interface means to allow a user of said
10 apparatus access to said information and/or said processed information in said storage means.

45. Apparatus according to claim 44 wherein said user interface means comprises a further I/O means.
15

46. Apparatus according to claim 44 wherein said user interface means comprises a computer program running on said processing means to allow a user of said computer system access to said information and/or said processed
20 information via said first I/O means.

47. Apparatus according to claim 46 wherein said user interface means comprises said processor means operating as a Web server.
25

48. Apparatus according to claim 47 wherein said processing means is operable to gather and process said

information for output to said user using machine independent instructions.

49. Apparatus according to any one of claims 42 to 49
5 wherein said second I/O means is adapted to receive configuration data from said management system, and said processing means is operative to process said information in accordance with said configuration data.

10 50. Apparatus for communicating with a remote system over a network to access a service, the apparatus comprising:

I/O means for connection to the network;

processing means for gathering information on the
15 use made of said service by said apparatus, for processing said information to generate processed information, and for controlling said I/O means to transmit said processed information to a remote management system; and

20 storage means for storing said information and/or said processed information.

51. Apparatus according to claim 50 including clock means, said processing means being responsive to said
25 clock to gather said information with respect to time, to process said information periodically, and to cause said I/O means to transmit said processed information

periodically to said remote management system.

52. Apparatus according to claim 50 or claim 51 including user interface means to allow a user of said
5 apparatus access to said information and/or said processed information in said storage means.

53. Apparatus according to claim 52 wherein said user interface means comprises a computer program running on
10 said processing means to allow a user access to said information and/or said processed information.

54. Apparatus according to claim 53 wherein said processing means is operable to gather and process said
15 information for output to said user using machine independent instructions.

55. Apparatus according to any one of claims 50 to 54 wherein said I/O means is adapted to receive
20 configuration data from said management system, and said processing means is operative to process said information in accordance with said configuration data.

56. A method of remotely configuring communication
25 apparatus for communication over a network to access a service, the method comprising the steps of:

connecting said communication apparatus to said

network;

said communication apparatus automatically communicating with a remote configuration system over said network using initial configuration data;

5 said communication apparatus transmitting unique identification information to said configuration system;

at said configuration system determining configuration data for said communication apparatus;

transmitting said configuration data to said
10 communication apparatus;

storing said configuration data received from said configuration data in storage means in said communication apparatus; and

controlling subsequent communications by said
15 communication apparatus over said network using the stored configuration data.

57. A method according to claim 56 including the further steps of:

20 transmitting subsequent configuration data to said communication apparatus from said configuration system;

storing said subsequent configuration data in said storage means; and

controlling subsequent communications by said
25 communication apparatus over said network in accordance with the stored subsequent configuration data.

58. A method according to claim 57 including the steps of a user of said communication apparatus generating a request for said subsequent configuration data, and transmitting said request to said configuration system
5 to initiate the transmission of said subsequent configuration data.

59. A method according to claim 57 wherein said subsequent configuration data is transmitted by said
10 configuration system automatically.

60. A method according to any one of claims 56 to 59 wherein said configuration data is transmitted over said network using a permanently open control channel
15 associated with a plurality of data/voice channels.

61. A method according to any one of claims 56 to 60 including the steps at said communication apparatus, of:
gathering information on the use of said service;
20 processing said information to generate summary information; and
periodically transmitting said summary information to a provider of said service.

25 62. A method according to claim 61 wherein said information is gathered in real time using a real time clock.

63. A method according to claim 61 or claim 62 including the step of supplying said information and/or said summary information to a user.

5 64. A method of controlling communications between a communication apparatus and a remote system over a network to access a service, the method comprising the steps at said communication apparatus, of:

gathering information on the use of said service by
10 said communication apparatus;

processing said information to generate processed information; and

transmitting said processed information to a remote management system.

15

65. A method according to claim 64 wherein said information is gathered with respect to time, processed periodically, and periodically transmitted to said remote management system.

20

66. A method according to claim 64 or claim 65 including the step of supplying said information and/or said processed information to a user.

25 67. Communication apparatus substantially as hereinbefore described with reference to any of the accompanying drawings.

68. A method of controlling communication apparatus substantially as hereinbefore described with reference to any of the accompanying drawings.

1/6

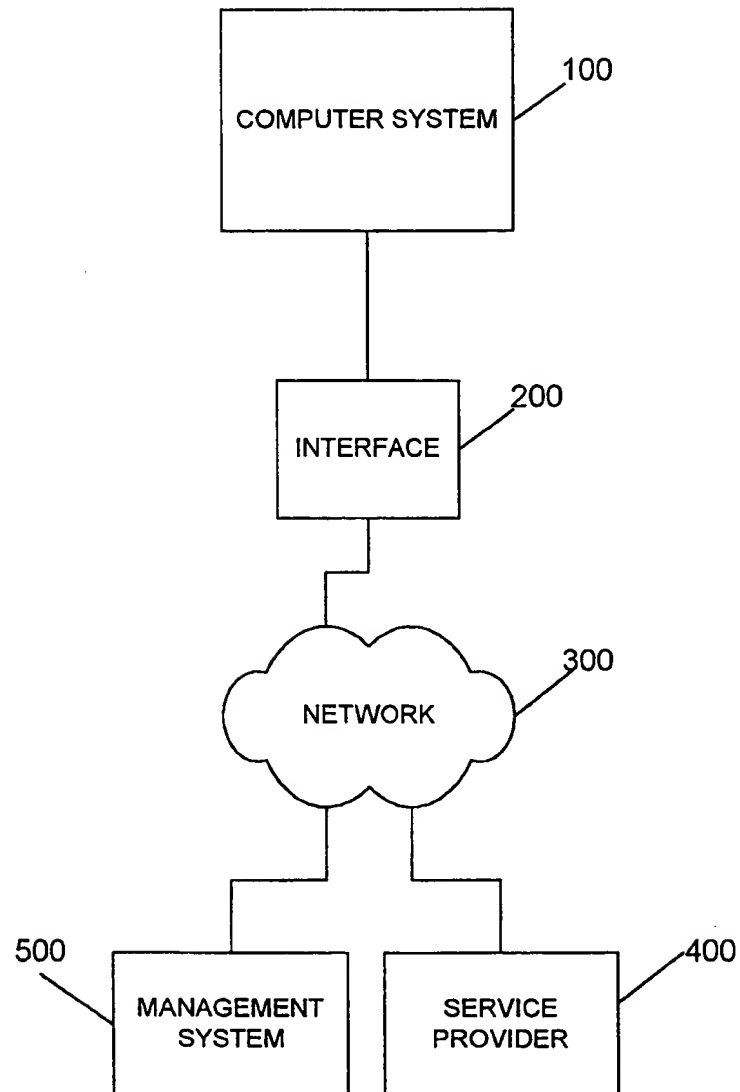


Fig 1

2/6

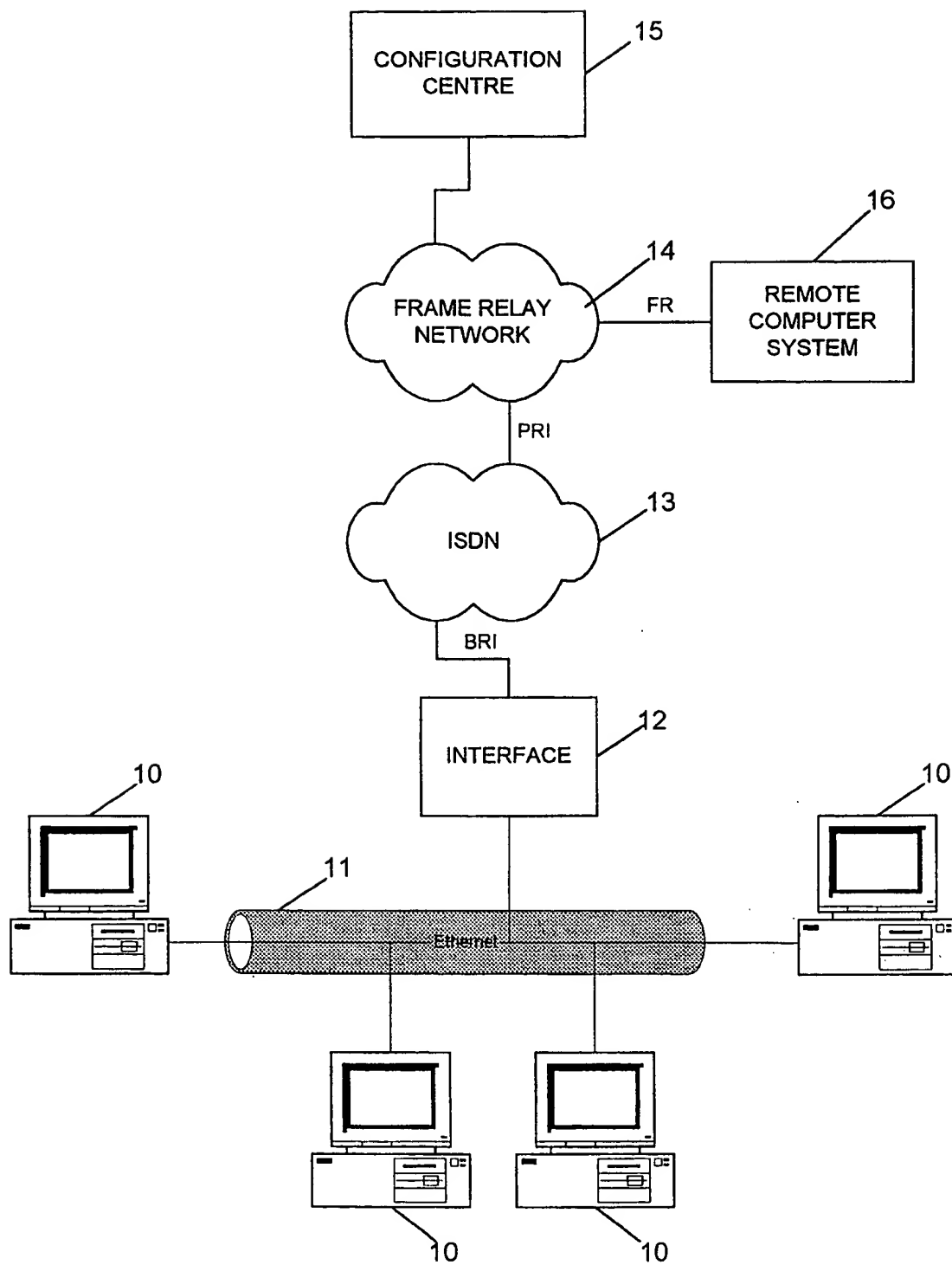


Fig 2

3/6

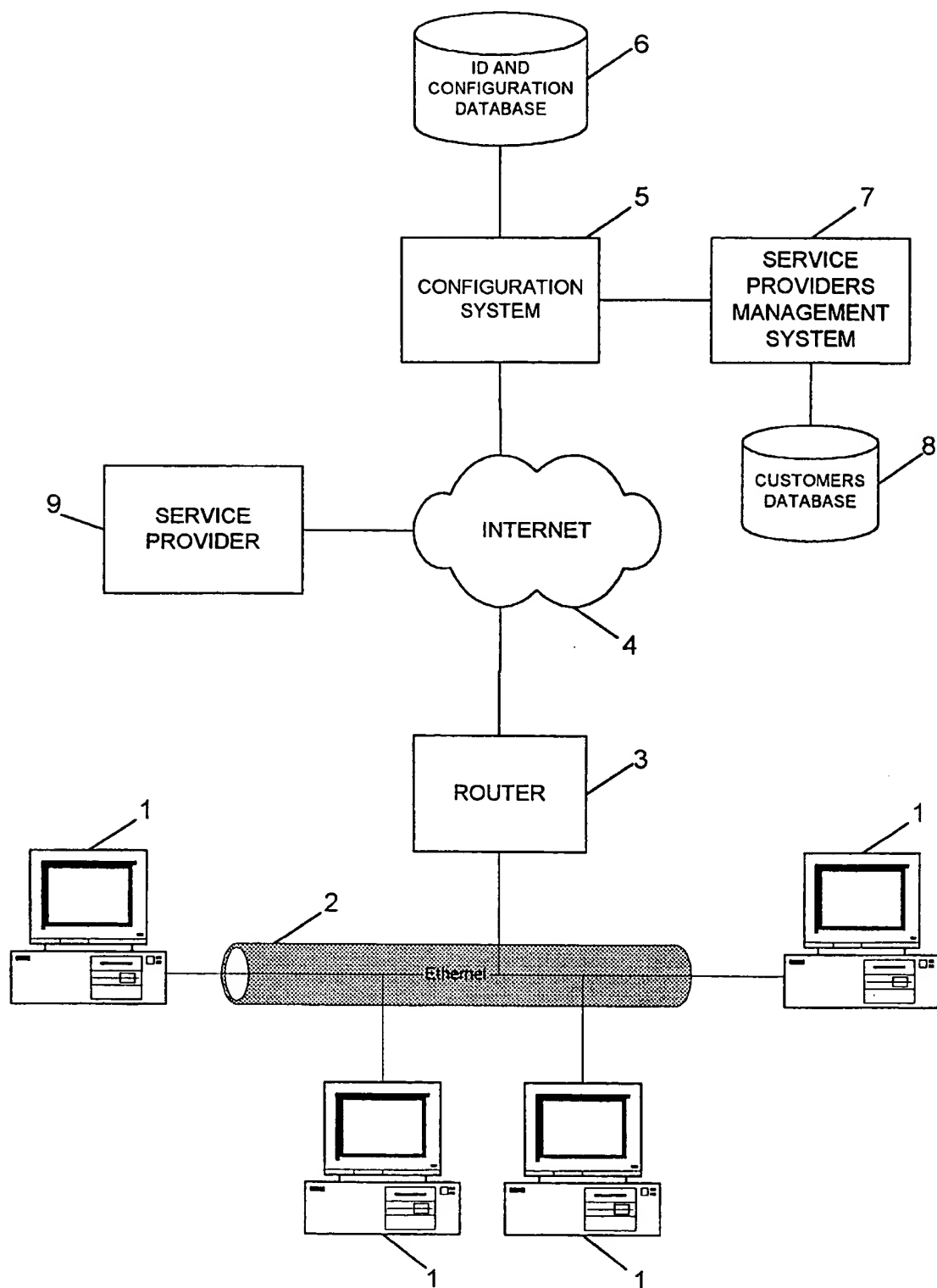


Fig 3

4/6

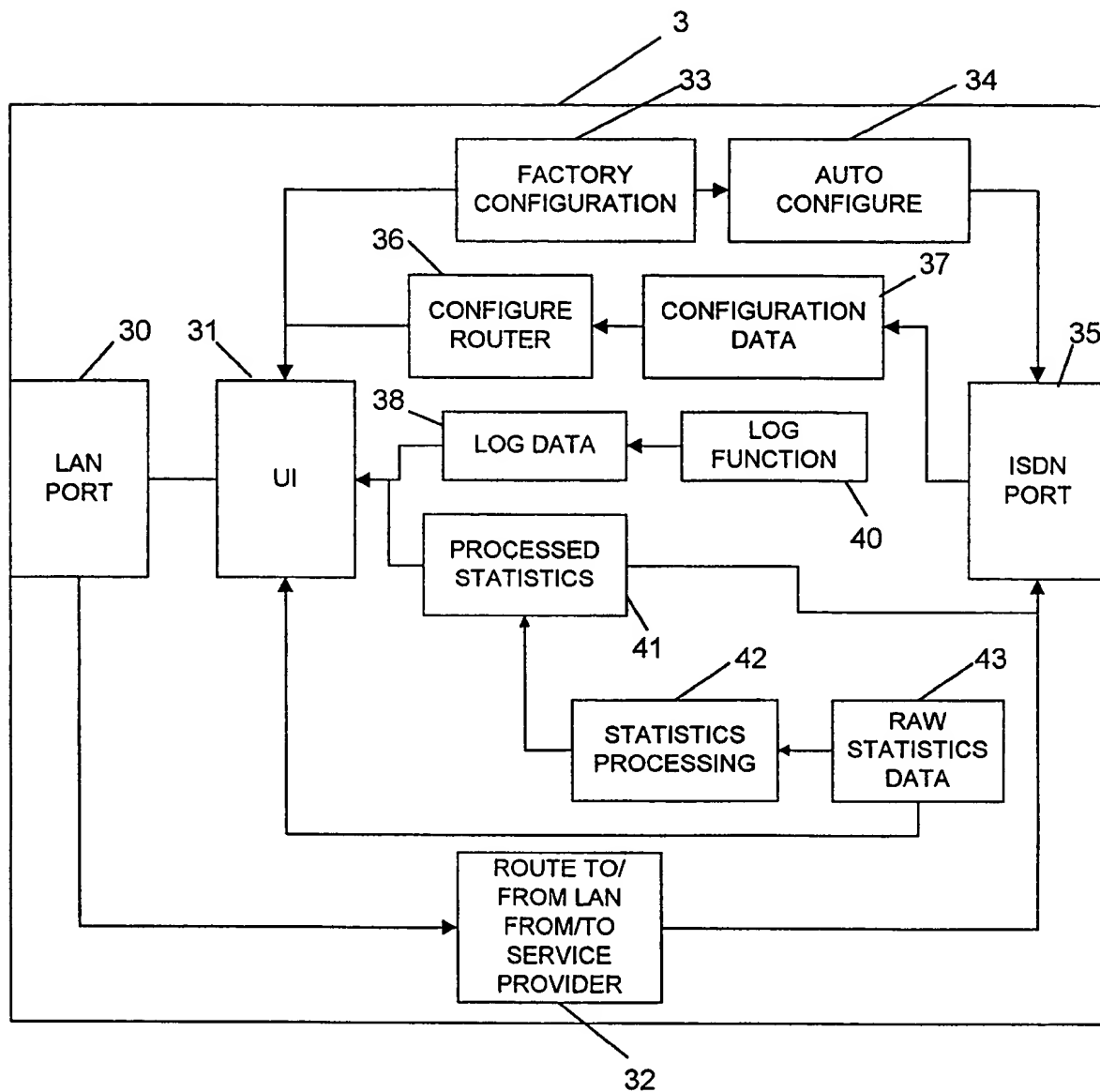


Fig 4

5/6

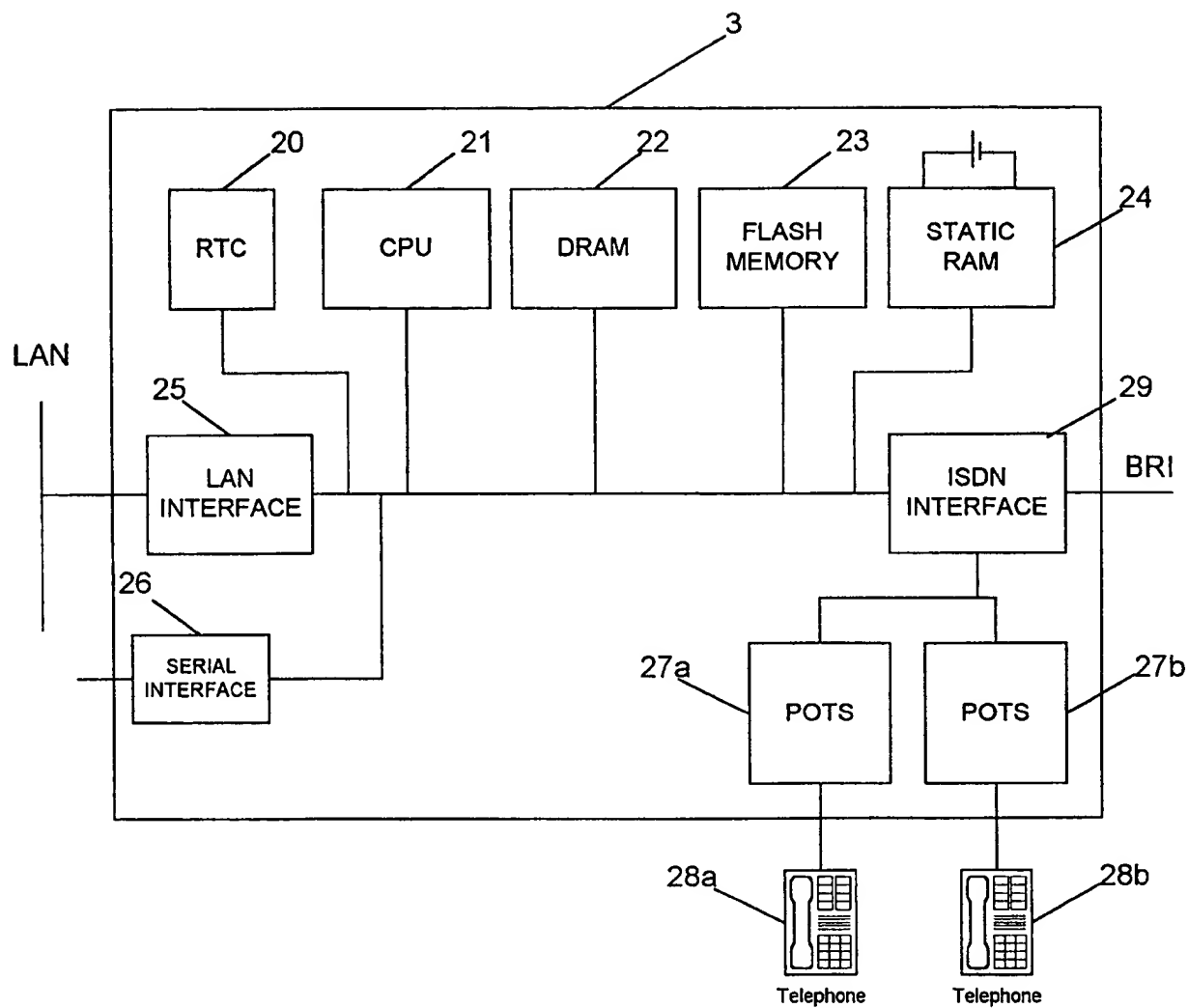


Fig 5

6/6

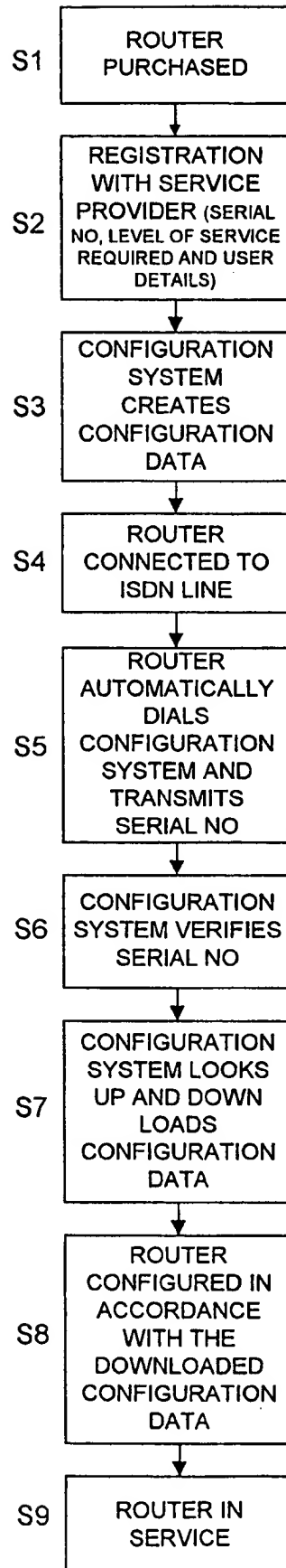


Fig 6

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 97/02850

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 H04L29/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|---|
| X | EP 0 793 170 A (SUN MICROSYSTEMS) 3 September 1997 | 1,6,7, 21, 33-35, 38,42, 50,56, 64,67,68 |
| | see abstract see column 1, line 1 - line 9 see column 1, line 32 - line 37 see column 2, line 40 - column 3, line 36 see column 4, line 12 - line 37 see column 4, line 42 - line 51 see column 5, line 45 - line 53 see column 6, line 34 - line 55 see column 7, line 5 - line 57 | |
| Y | --- | 2-5,8,9, 11,20, 22-24, 26,57 |
| | --- -/-- | |

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

18 June 1998

Date of mailing of the international search report

26/06/1998

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Larcinese, C

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 97/02850

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|----------|--|---|
| Y | EP 0 791 881 A (COMPAQ COMPUTER CORPORATION) 27 August 1997 | 2-5, 8, 9, 11, 20, 22-24, 26, 57 |
| | see abstract | |
| | see page 2, line 16 - line 32 | |
| | see page 2, line 49 - line 57 | |
| A | see page 3, line 15 - line 30 | 1, 21, 33, 42, 50, 67, 68 |
| | --- | |
| Y | US 5 557 748 A (NORRIS) 17 September 1996 | 11, 20 |
| | see abstract | |
| | see column 2, line 12 - line 17 | |
| | see column 4, line 60 - line 65 | |
| | see column 5, line 52 - column 6, line 15 | |
| | ----- | |

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 97/02850

| Patent document cited in search report | | Publication date | Patent family member(s) | | Publication date |
|---|---|---------------------|----------------------------|---|---------------------|
| EP 793170 | A | 03-09-1997 | JP 10074147 | A | 17-03-1998 |
| EP 791881 | A | 27-08-1997 | JP 10040196 | A | 13-02-1998 |
| US 5557748 | A | 17-09-1996 | NONE | | |